

## Remarks

The Examiner has rejected the claims as being anticipated by or unpatentable over US-5730528 (Allison et al) and/or newly cited US-4560286 (Wickersheim).

***The subject-matter of the independent claims (claims 20, 32, 35 and 47) is not anticipated by and unpatentable over Wickersheim.***

The claimed invention requires *inter alia* a machine, where specifically claimed as a gas turbine engine, which has one or more internal components coated with a thermal barrier coating comprising a mixture of at least a refractory material and an indicator material having an optical emission spectrum which varies in response to a temperature of the respective component. Wickersheim makes no disclosure or suggestion of such a thermal barrier coating.

As noted by the Examiner, Wickersheim does disclose (column 5, lines 35 to 46) the coating of a solid object (20) by a phosphor coating (40), where the phosphor is characterized by emitting, when excited, electro-magnetic radiation within separable bandwidths at two or more distinct wavelengths and with relative intensities in those bands that vary as a known function of the temperature of the phosphor (40).

While it is acknowledged that Wickersheim discloses the coating of a solid object (20) by a phosphor coating (40) and that the emission of the phosphor, when excited, enables the measurement of the temperature of the phosphor, the phosphor coating (40) is not a thermal barrier coating as set forth in the claims.

A simple coating and a thermal barrier coating are not the same. A thermal barrier coating is not merely a coating which can withstand high temperatures, but rather a coating over the surface of a component which has thermal insulating and structural properties which provide for protection of the underlying component at high temperatures, typically in gas turbine engines which experience very high temperatures, typically greater than 1000 °C, over extended periods of time, typically several thousand hours. Indeed, Wickersheim discloses (column 7, lines 61 to 68) that the phosphor of the phosphor coating (40) is applied as a paint to the solid object (20). Such a painted phosphor is a coating, but manifestly **not** a thermal barrier coating.

As regards the teaching of Wickersheim, it is important to recognize that the teaching of Wickersheim is to temperature measurement and not the provision of a

thermal barrier coating. Wickersheim makes no suggestion whatsoever as to the provision of a thermal barrier coating.

The Examiner has made reference to the teaching (column 18, lines 18 to 24) in Wickersheim regarding application to turbines.

This teaching is acknowledged, but this teaching is to the provision of a probe (22), and then for the purposes of temperature measurement. Wickersheim discloses (column 14, lines 11 to 14) that the probe (22) contains a phosphor for the purposes of enabling temperature measurement. There is, however, no suggestion at all as to the provision of a thermal barrier coating.

Accordingly, it is submitted that the claimed invention is clearly patentable over the disclosure of Wickersheim.

***The subject-matter of the independent claims (claims 20, 32, 35 and 47) is not anticipated by and unpatentable over Allison et al.***

As stated above, the claimed invention requires *inter alia* a machine, where specifically claimed as a gas turbine engine, which has one or more internal components coated with a thermal barrier coating comprising a mixture of at least a refractory material and an indicator material having an optical emission spectrum which varies in response to a temperature of the respective component. Allison et al makes no disclosure or suggestion of such a thermal barrier coating.

As noted by the Examiner, Allison et al discloses (column 5, lines 7 to 10) the provision of a coated phosphor pad (12) on an article (14), such as a component of a turbine engine, as clearly illustrated in Figure 1, for the purposes of enabling temperature measurement.

This coated phosphor pad is, however, not a thermal barrier coating, where, as mentioned hereinabove, a thermal barrier coating is a coating over the surface of a component which has thermal insulating and structural properties which provide for protection of the underlying component at high temperatures.

As regards the teaching of Allison et al, it is important to recognize that the teaching of Allison et al, similarly to that of Wickersheim, is to temperature

measurement and not the provision of a thermal barrier coating. Allison et al makes no suggestion whatsoever as to the provision of a thermal barrier coating, in being motivated only by the provision of a phosphor pad for the purposes of enabling temperature measurement.

The entire teaching of Allison et al is to the provision of a temperature-sensitive phosphor pad and the method of measuring temperature using the same (column 1, lines 11 to 15 and lines 52 to 54). This fact is clearly evidenced by the disclosure (column 4, lines 29 to 40) that the phosphor pad can be a coated pad, a single crystal pad or a sintered pad, where optionally fabricated to fit the underlying component. It is inconceivable that a person skilled in the art would have interpreted the teaching of Allison et al as to anything other than the provision of a discrete phosphor pad for the purposes of temperature measurement, and to allege otherwise would manifestly require an impermissible hindsight analysis of the prior art.

Accordingly, it is submitted that the claimed invention is clearly patentable over the disclosures of Allison et al.

### ***Conclusion***

In view of the foregoing, request is made for timely issuance of a notice of allowance. In the event the Examiner does not agree with the foregoing, the Examiner is requested to telephone the undersigned to arrange a time for an interview.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By   
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Don W. Bulson, Reg. No. 28,192

1621 Euclid Avenue  
Nineteenth Floor  
Cleveland, Ohio 44115  
(216) 621-1113